THURSDAY, JULY 3, 1913.

AN EPITOME OF GEOMETRICAL CRYSTALLOGRAPHY.

Statische und kinetische Kristalltheorien. By Dr. J. Beckenkamp. Erster Teil. Pp. viii + 206. (Berlin: Gebrüder Borntraeger, 1913.) Price 9.60 marks.

THE style of this book recalls that of parts of the "Encyclopädie d. math. Wissenschaften." A summary is given of practically the whole of geometrical crystallography, both experimental and theoretical. There is included, for instance, an account of crystalline symmetry and structure theory, together with a description of the common types of twinning, habit, &c. Physical crystallography, including the optical, elastic, and electrical behaviour of crystalline media, lies outside the scope of the book.

It will be readily realised that so large a field cannot be adequately covered in 206 pages. The author confines himself almost entirely to the quoting of results. For example, formulæ are given to obtain the most probable values of the true angles between four crystal-faces from the observed angles, and also formulæ for calculating the angles between these four faces and the remaining faces; but no indication is given of the method of arriving at these results. Again, though the thirty-two crystal classes are described in detail, no proof is given of the fact that there are exactly thirty-two classes—and similarly throughout the treatise.

Dr. Beckenkamp is evidently interested in the history of crystallography; and he begins each section with a historical summary of work done on the subject-matter of that section from the earliest days of the science, with quotations from various authors and valuable references.

The book is illustrated by 303 excellent diagrams, well drawn, and easy to follow except for those illustrating the author's theory of molecular groups, which are on rather too small a scale to be clearly visible.

The style of the work is clear and interesting, and the book is divided into sections of a convenient length, so that the reader is not tired by over-concentration on a particular theme.

The book will be a useful addition to the literature of the subject, especially as a work of reference; but even the beginner will find it attractive, though he will require to supplement it by some work which goes into more detail. Perhaps the least satisfactory part is that dealing with the author's own structure theory. He has scarcely succeeded in making his point of view clear; and, in fact, the task of explaining a new structure theory of crystals in six pages without the assistance of a single mathematical formula would lie beyond the powers of any writer. But doubtless this will be remedied when part ii. appears.

HAROLD HILTON.

A HISTORY OF CHEMISTRY.

A History of Chemistry from the Earliest Times till the Present Day. By the late Prof. J. C. Brown. Pp. xxx + 543. (London: J. and A. Churchill, 1913.) Price 10*s.* 6*d.* net.

THE late Prof. Campbell Brown, of the Liverpool University, was in the habit of delivering annually a series of lectures on the history of chemistry to his senior students as part of their degree course, and he had the intention, on his retirement, of preparing these lectures for publication. His sudden and unexpected death while still in the occupation of his chair prevented him from personally realising his wish. Mrs. Campbell Brown, with the assistance of Mr. Henry H. Brown, and Prof. Brown's late chief assistant, Mr. W. H. Roberts, has, however, sought to give effect to his intention, and the present handsome volume is the result of their labours. Its compilation has obviously been a labour of love, and forms a fitting memorial to a singularly earnest, conscientious, and high-principled man who played a notable part in the educational history of Liverpool, and particularly in the creation and development of its University. Its preparation for press must have been a matter of no little difficulty, and the form in which it is now presented reflects great credit upon Mr. H. H. Brown and his coadjutor.

The original matter was largely in the form of notes, more or less complete, which the lecturer was accustomed to amplify and comment upon at the moment, and there is little doubt that, had Dr. Brown lived to complete the work, much additional matter would have been included. Possibly, also, some omissions and corrections would have been made in the light of more exact knowledge. The book makes no pretensions to research among original authorities, and it is obvious that the lecturer had been content to take his facts and interpretations from well-known sources, such as Thomson, Hoefer, Kopp, Meyer, Ladenburg, Berthelot, and others that might be named. In many cases the illustrations, as well as the phraseology, afford the key to the source of the statements. The book is eminently readable, and may be recommended to the student who

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desires only a very general acquaintance with the main lines of the historical development of the science, without too much critical detail. Considering the immensity of the subject, a great amount of information has been packed into the five hundred pages of which the work consists.

The book is prefaced by a short biographical note in which the main features of Dr. Brown's character, and the chief incidents in what was practically a lifelong connection with Liverpool, are dealt with sympathetically. There is also an excellent and characteristic portrait of the professor by way of frontispiece. T.

REPRODUCTION AND DEVELOPMENT.

(1) *Vertebrate Embryology: Comprising the Early History of the Embryo and its Foetal Membranes.* By Dr. J. W. Jenkinson. Pp. 267. (Oxford: Clarendon Press, 1913.) Price 12*s*. 6*d*. net.

(2) *Problems of Life and Reproduction.* By Prof. Marcus Hartog. Pp. xx+362. (London: John Murray, 1913.) Price 7*s*. 6*d*. net.

(1) DR. JENKINSON'S "Vertebrate Embryology" will be welcomed by all students of that subject in this country. Hitherto the only book on embryology of convenient size and suitable for elementary students has been Bryce's volume in "Quain's Anatomy," but this work is devoted almost exclusively to human embryology, and is avowedly intended for students of medicine rather than for those taking zoology for an honours degree in science. Dr. Jenkinson's book will not be without utility to the more advanced workers in the subject, including original investigators and teachers. To each chapter there is appended a short bibliography which affords a valuable guide to the literature.

In the first chapter, which is introductory in character, it is shown that the structural differentiation which occurs in embryonic development (and also in later life) takes place by movements either of single cells or of cell aggregates, and finally through the assumption by the cells of the histological characters peculiar to each kind of tissue. It is pointed out further that it is not a process of cell division which produces the differentiation, since differentiation already exists in the ovum prior to segmentation, and is, indeed, the real cause of the differentiations which subsequently manifest themselves. The second chapter is upon growth, and is illustrated by figures of growth taken mainly from the work of Minot, and showing the daily percentage increments in the weights of man and animals.

Chapters iii. and iv. are upon the germ-cells, and contain admirable accounts of the phenomena of spermatogenesis, oogenesis, and fertilisation. The author accepts the view that the germ-cells are not all formed in or from the germinal epithelium, but that the first to develop come from the endoderm or splanchnopleure (mesoderm) of the gut or yolk-sac, and reach their final resting-place by migrating there. There is no mention, however, of Miss Lane-Claypon's statements (at present unconfirmed) regarding the origin of ova from ovarian interstitial cells after the attainment of sexual maturity. The author states that the follicle cells are also probably derived from the germinal epithelium, but the recent work of Miss McIlroy is not quoted. In referring to the corpus luteum, the author says that this organ secretes a substance which appears to be necessary for the proper attachment of the embryo by means of the placenta. The theory has often been stated in this form, but it now appears to the reviewer that in a work like the present it might be better to assert merely that the hypertrophy of the follicle cells is functionally correlated with the contemporaneous uterine hypertrophy, which is a necessary factor in the growth of the placenta and the nourishment of the embryo, and cannot occur in the absence of luteal tissue in the ovary. The truth of the hypothesis stated in this general form seems to be beyond question, whereas the exact nature of the correlation is a problem which still awaits complete solution.

Space does not admit of more than a passing mention of the succeeding chapters; they deal with segmentation, the germinal layers, the early stages in the development of the embryo, the fœtal membranes, and the placenta. The chapter on the placenta is of especial interest, for Dr. Jenkinson writes with the authority of an original investigator. The physiological side of the subject is not neglected, and there are new and interesting details concerning the œstrous cycle. A word must be added in praise of the numerous illustrations, which, with very few exceptions, were drawn specially for this book.

(2) Prof. Hartog's work consists of a collection of essays contributed at various times during the last twenty-one years to different journals, and embodying his views on certain biological questions of importance. The majority of the articles are republished with little alteration, but the fourth chapter, in which the author's views on the physics of cell-division are put forward, has been almost entirely re-written.

The first chapter is entitled "Some Problems of Reproduction," and contains an account of the author's theory as to the significance of the polar bodies, which are regarded merely as the products of brood-divisions of the ovarian egg.

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